CONTRIBUTIONS
TO NATURAL SCIENCE
PUBLISHED BY THE ROYAL BRITISH COLUMBIA MUSEUM
675 BELLEVILLE STREET, VICTORIA, B.C., CANADA V8V 1X4

Number 8 ISSN 0829-609X June 15, 1988

Range Extensions of Three Caridean Shrimps to British Columbia Waters

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Abstract: New ranges are recorded for three caridean shrimps, *Neocrangon resima* (Rathbun 1902), *Lebbeus pol* ine 1824) and *Heptacarpus taylori* (Stimpson 1857). Biological descriptions are provided using the format of Butler (1980).

Introduction

Since publication of a review on shrimps of the Pacific coast of Canada (Butler 1980), three species not previously recorded from British Columbia have been added to the fauna. These are *Neocrangon resima* (Rathbun, 1902), *Lebbeus polaris* (Sabine, 1824), and *Heptacarpus taylori* (Stimpson, 1857).

This article records the new distributional ranges of these species, and provides detailed biological descriptions. Redescription of these species was thought to be necessary because of the lack of detail in the original descriptions. Descriptions in this paper are based on specimens collected in British Columbia waters, and follow the format used by Butler (1980). Common names and synonymies reflecting major nomenclatural changes are included. Material examined is listed in Table 1. Specimens are in the collection of the Royal British Columbia Museum (formerly the British Columbia Provincial Museum (BCPM)), except for those specimens of *Neocrangon resima* borrowed from Bamfield Marine Station (BMS), Dobrocky Seatech (DS), and the Smithsonian Institution (USNM).

Family Crangonidae

Neocrangon resima (Rathbun, 1902) Rathbun crangon (Fig. 1)
Crangon resima Rathbun, 1902
Crago resima—Schmitt, 1921
Neocrangon resima—Kuris and Carlton, 1977

Description: Body slender, depressed. Shell thin, sparse, short pubescence on carapace and in abdominal sulci. Rostrum short, about 0.25–0.30 carapace length, tapering to an acute tip, advanced beyond the eyes and ascending at approximately a 45° angle; produced ventrally in a thin compressed plate. Carapace spines: 2 median on anterior half of carapace, anterior spine slightly smaller; median dorsal carina originating in front of anterior spine and extending to posterior half of carapace; antennal moderate, with supporting carina; branchiostegal spine strong, with carina; pterygostomian weak; hepatic strong; lateral margin of rostrum continuing posteriorly over orbit of eye as carina above and beyond hepatic spine. Eye moderately large, cornea well developed, tubercle weak. Antennule: peduncle moderately long, second segment 1.5–2.0 length of third; third segment with a dorsal, distal lobe; stylocerite short; outer flagellum reaching end of antennal scale, inner flagellum longer. Antenna: scale shorter than telson, spine exceeding lamella; basicerite with dorsal lobe and anterolateral spine. Peduncle moderately long, reaching to approximately middle of antennal scale; flagellum almost as long as body. Third maxilliped: long, slender, reaching past end of antennal scale; distal part of antepenultimate segment twisted; exopod 0.2–0.25 length of third maxilliped, with lash. Pereiopods: I as long as third maxilliped, subschelate, stout except for ischium and merus proximally; merus with strong dorsal and weak lateral spine on distal edge; carpus, 2 weak distal spines; propodus widening distally, length 3.2–3.5 average width; fixed finger long and stout; dactylus when flexed obliquely transverse; II slightly shorter than I, slender chelate; III longer than II; slightly more slender; dactylus slender, approximately 0.33–0.38 propodus length; IV slightly shorter than III, stouter; dactylus slender, about 0.75–0.8 propodus length; V longer than IV, slightly more slender; dactylus slender, 0.65–0.75 propodus length. Abdomen: First and second somites each with transverse sulcus; third somite with low, wide, median dorsal carina, transverse sulcus anterior to carina, second transverse sulcus in posterior half of somite interrupted dorsally by median carina; fourth with moderate median dorsal carina with depressed areas on either side of carina; transverse sulcus, interrupted dorsally by

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carina; fourth pleuron with weak posteroventral spine; fifth somite with moderate median dorsal carina, depressed area on either side of carina, transverse sulcus anterior to carina; pleuron of fifth with a moderate posteroventral spine; sixth, 2 prominent dorsal carinae with median sulcus between, sulcus on lateral side of each carina, moderate posterolateral spine and weak posteroventral spine; telson moderately wide at base, tapering to an acute tip; median sulcus with fine pubescence; 2 pairs dorsolateral spines; inner uropod longer than outer, former reaching end of telson or slightly beyond.

Remarks: Following Kuris and Carlton (1977), the genus *Neocrangon* replaces *Crangon* for those species having 2 median carapace spines and 2 prominent dorsal carinae on the sixth abdominal segment. Two other local species *N. communis* (Rathbun, 1899) and *N. abyssorum* (Rathbun, 1902) are included in this genus.

Contrary to earlier diagnoses of *N. resima* (Rathbun 1904, Schmitt 1921), all specimens examined had short pubescence on the carapace and in the abdominal sulci.

Color: Unavailable.

Distinctions: Distinguished from other local species of *Neocrangon* by the rostrum ascending at about a 45° angle and having a thinly compressed plate extending ventrally. Rostrum longer than in *N. communis*, usually advanced beyond the eyes. Eyes smaller and rostrum wider than *N. abyssorum*.

Maximum lengths: Males: carapace 11.1 mm, total 55 mm; females: carapace 14.3 mm, total 70 mm.

Range: Alice Arm, British Columbia to San Domingo Pt., Baja California (Rathbun 1904). Occurs along the entire coast of British Columbia. Six female and two male specimens (BCPM Cat. Nos. 982-331-1 and 982-343-1) taken in two collections in Alice Arm (55° 25.03′N, 129° 40.78′W and 55° 25.00′N, 129° 40.78′W), extend the known range of this species approximately 770 km north of the previously recorded northern limit of Puget Sound and the San Juan Islands (Kozloff 1974). Of 42 collections examined from throughout British Columbia, depths ranged from 19 to 284 m, although the species is known to occur at much greater depths (Rathbun 1904).

The first known collection of *N. resima* in British Columbia waters was by C. M. Fraser, on June 18, 1915, in Pylades Channel (49° N, 123° W) at 54 m (BCPM Cat. No. 976-1160-4). This collection was overlooked until recently, because the single specimen was misidentified and included in a collection of *Neocrangon communis*.

Biology: Occurs on mud or mixed mud and sand bottoms coastwide. Often collected in association with *Neocrangon communis* which it closely resembles and with which it is sometimes confused.

Ovigerous females, 7.1–13.2 mm carapace length, have been collected from January through May. Egg size has been reported as 0.68 × 0.75 mm (Zarenkov 1965).

Two specimens collected off Owen Pt., Vancouver Island, were parasitized by the rhizocephalan *Mycetomorpha vancouverensis* Potts, 1912.

Predators include the flathead sole *Hippoglossoides elassodon* Jordan and Gilbert, 1880, the black skate, *Raja kincaidi* Garman, 1908 and the Pacific cod, *Gadus macrocephalus* Tilesius, 1810 (unpublished data, Pacific Biological Station, Nanaimo, B.C.).

Family Hippolytidae

Lebbeus polaris (Sabine, 1824) Polar lebbeid

Alpheus polaris Sabine, 1824
Spirontocaris unalaskensis—Rathbun, 1902
Spirontocaris poiaris—Rathbun, 1904
Lebbeus polaris—Holthuis, 1947

Description: Moderately stout, little compressed, carapace deep. Shell thick, surface slightly rough. Rostrum moderately long, 0.6–1.08 carapace length, knifelike, slightly descending, 0-8/1-5, tip acute. Carapace spines: supraorbital moderate; suborbital moderate; antennal strong; pterygostomian moderate. Eye moderate, cornea well developed. Antennule: peduncle moderate, third segment longer than second, strong dorsal spine on each of 3 segments; stylocerite strong; inner flagellum longer than outer, both extend beyond rostrum. Antenna: scale about as long as telson, lamella exceeds spine; basicerite, dorsal rounded lobe, strong ventrolateral spine; peduncle moderate, flagellum shorter than body. Third maxilliped: long, moderately stout; epipod. Pereiopods: I shorter than third maxilliped, stout; chelate; epipod; II longer than I, slender; carpus, 7 segments; chelate; epipod; III shorter than II, stouter; merus, 5–10 spines; dactylus moderately stout, about 0.2 propodus length, 4–5 spines, bifid; IV shorter than III, as stout; merus, 1–9 spines; dactylus moderately stout, about 0.2 propodus length, 4–5 spines, bifid; V shorter than IV, as stout; merus, 1–7 spines; dactylus moderately stout, about 0.2 propodus length, 3–5 spines, bifid. Abdomen: dorsal posterior margin of third somite produced moderately; posterolateral margins of fourth and fifth moderately recessed at articular knobs; pleuron of fourth with weak ventral spine; fifth with strong posterolateral spine; sixth shorter than telson, posteroventral spine strong, slightly flared; telson narrow, tapering to rounded tip, 4–8 dorsolateral spines, 4 or 6 ciliated distal spines inside pair of distolateral spines on each side; outer uropod longer than inner, both exceed telson.

Remarks: For illustrations of *L. polaris* refer to Smaldon (1979) or Williams (1984).

Color: Bright red, with concentrated spots formed by red and orange chromatophores on dorsal side of carapace and abdomen (Squires 1965).

Distinctions: Distinguished from *L. grandimanus* (Brazhnikov, 1907) by the 4 or 6 ciliated distal spines on telson, the antennal scale about as long as telson, rostrum normally longer than antennular peduncle, and each pleuron of fourth somite normally with ventral spine. Other species of *Lebbeus* now known in B.C. waters have epipods on the first to third pereiopods.

Maximum Lengths: Males: carapace 18 mm; females: carapace 20 mm; maximum total length of the species unavailable.

Range: North Atlantic, from polar regions to Skaggerak and Hebrides in Europe, and to Cape Cod in America; Bering Sea, Okhotsk Sea, Aleutian Islands; intertidal to 930 m. (Squires 1965).

First collection on the Canadian Pacific coast was by personnel of Dobrocky Seatech Ltd., Victoria, B.C. in Alice Arm (55° 26.2′N, 129° 39.7′W), at 102 m, on August 25, 1982 (BCPM Cat. No. 987-26-1).

A previous record of *L. polaris* from Dixon Entrance, British Columbia (Butler 1964), proved to be *L. grandimanus*. This record was later corrected by Butler (1980).

Biology: The one specimen from Alice Arm, a female having a carapace length of 13 mm, had well developed ovaries, visible through the carapace. Squires (1965) reported that males and females were first mature at carapace lengths of 6 and 8 mm, respectively.

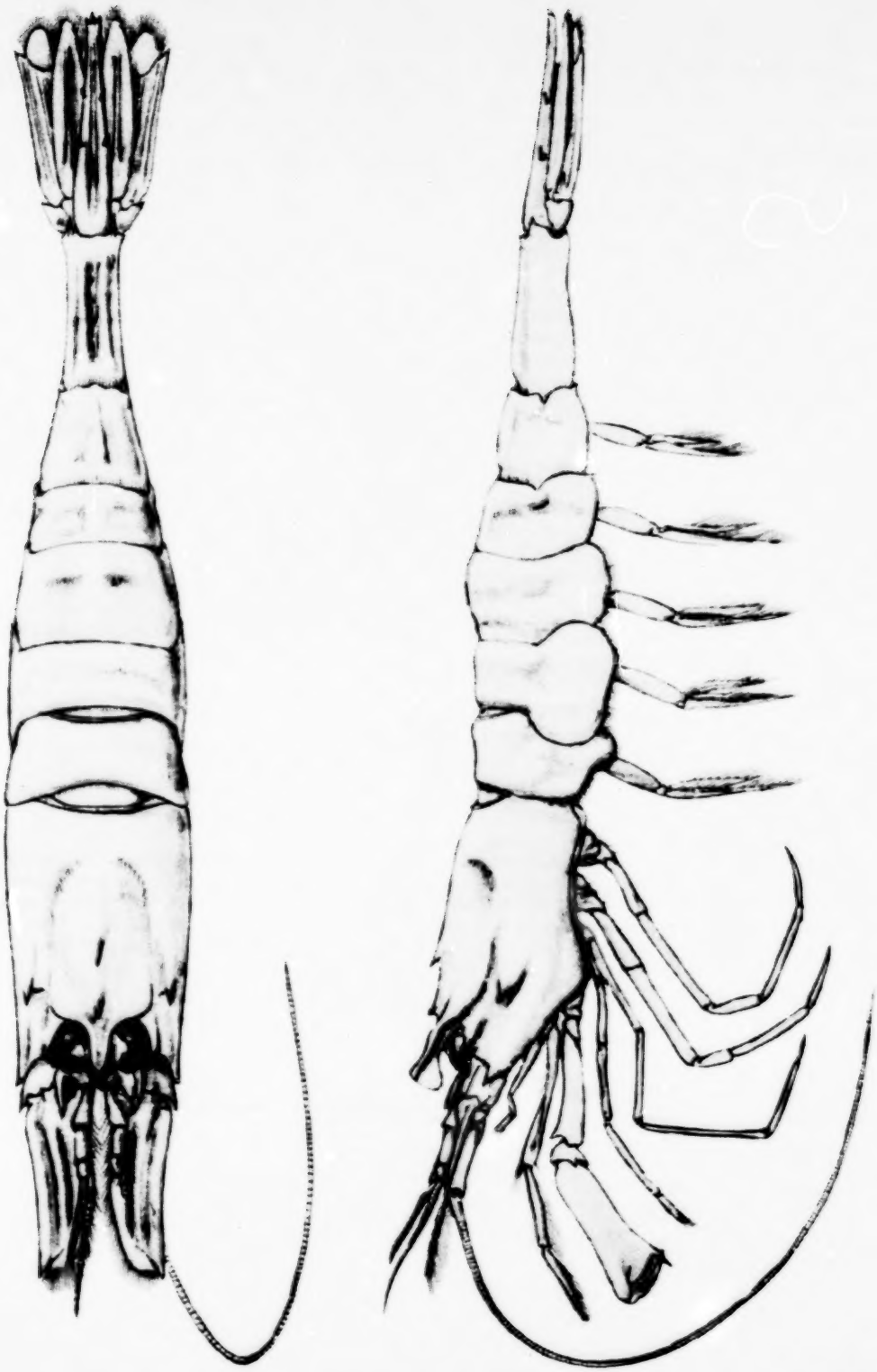

Fig. 1. Neocrangon resima (Rathbun, 1902)

Heptacarpus taylori (Stimpson, 1857) Taylor coastal shrimp (Fig. 2)

Hippolyte taylori Stimpson, 1857
Spirontocaris taylori — Rathbun, 1904
Heptacarpus taylori—Holthuis, 1947

Description: Body stout, robust, little compressed, carapace deep. Shell thick, surface smooth. Rostrum short, 0.25–0.40 carapace length, mainly horizontal, 3–7/0, tip acute or bifid. Carapace spines: suborbital moderate, rounded; antennal strong; pterygostomian moderate. Eye small, stalk slender, cornea well developed. Antennule: peduncle long; third segment slightly longer than second, each with a prominent dorsal, distal spine, basal segment with 3 spinules on dorsal distal margin; stylocerite moderately long; outer flagellum setiferous, exceeds antennal scale, inner slightly longer. Antenna: scale 0.85–0.9 length of telson, lamina exceeds spine; basicerite with 2 strong lateral spines; peduncle moderately long, flagellum shorter than body. Third maxilliped: long, moderately stout, distal segment setiferous; epipod. Pereiopods: I shorter than third maxilliped, stout; chelate; epipod; II longer than I, slender, carpus 7 segments; chelate; epipod; III shorter than II, stouter, merus, 1 spine; propodus, 12–14 spinules, 1–2 rows; dactylus stout, about 0.3 propodus length, 6 spines, bifid; epipod; IV about as long as III, as stout; merus, 1 spine; propodus, 14–15 spinules, 1–2 rows; dactylus stout, about 0.3 propodus length, 6 spines, bifid; V shorter than IV, as stout; merus, 1 spine; propodus 13–14 spinules, 1–2 rows, distal ones forming brush; dactylus stout, about 0.3 propodus length, 5–6 spines, bifid. Abdomen: faint transverse dorsal sulcus on second somite; pleuron of fourth with moderate ventral spine; posterolateral margins of fourth and fifth widely recessed at articular knobs; fifth with strong posterolateral spine; sixth stout, 1.25 times as long as fifth, with moderate posterolateral spine; telson wide, tapering to rounded tip, 3 pairs dorsolateral spines; inner uropod slightly longer than outer, both exceed telson.

Color: Highly variable, including red-brown, greenish with white carapace or mottled colors (Carlton and Kuris 1975).

Distinctions: Distinquished from the other local species having epipods on pereiopods I–III, *H. stimpsoni* Holthuis, 1947 and *H. brevirostris* (Dana, 1852) by its short rostrum, not reaching beyond the eye; from the former, by its stout dactyli with bifid tips on pereiopods III–V, and absence of ventral spines on rostrum; and, from *H. brevirostris*, by its relatively short third maxilliped and first pereiopod, without rows of spinules on antepenultimate segment, and on merus, respectively.

Maximum lengths: Males: carapace 3.9 mm, total 25 mm; females: carapace 6.3 mm, total 32 mm.

Range: Queen Charlotte Sound, British Columbia to Magdalena Bay, Baja California (Rathbun 1904); intertidal to 13 m (Word and Charwat 1976).

The first known collection of the species on the British Columbia coast was by D. B. Quayle in the intertidal of the lagoon on the north side of Triquet Island (51° 48.4′N; 128° 14.3′W) in Queen Charlotte Sound on May 16, 1972 (BCPM 987-27-1). The previously recorded northern limit was Puget Sound and San Juan Islands (Kozloff 1974).

Biology: Among the five specimens collected by Dr. Quayle were three females, two of which were ovigerous (5.5 and 6.3 mm carapace length). In California, this shrimp lives among rocks and algae, and on pilings (Chace and Abbott 1980).

Discussion

Although *Lebbeus polaris* and *Heptacarpus taylori* are each represented in British Columbia by only one collection, it is assumed that these species are present elsewhere in B.C. within the ranges stated previously. Lack of further B.C. records for these species can probably be attributed to a lack of extensive collecting in many areas of B.C.

Neocrangon resima is fairly well represented in the collection of the Royal British Columbia Museum, with collections from 51 localities throughout B.C. (Table 1). *N. resima* is often confused with the more common *Neocrangon communis*, especially when the two species are collected together. This may be the reason why *N. resima* has remained unreported until now.

Large areas of British Columbia's coastal waters have yet to be adequately sampled and studied. Further study and collecting will undoubtedly yield new information on the species composition and distribution in B.C. waters.

Acknowledgements: We are grateful to A. A. Denbigh for the illustrations of *Neocrangon resima* and *Heptacarpus taylori*. Dobrocky Seatech Ltd. supplied specimens of *N. resima* and *Lebbeus polaris*. Bamfield Marine Station and the Smithsonian Institution supplied specimens of *N. resima*.

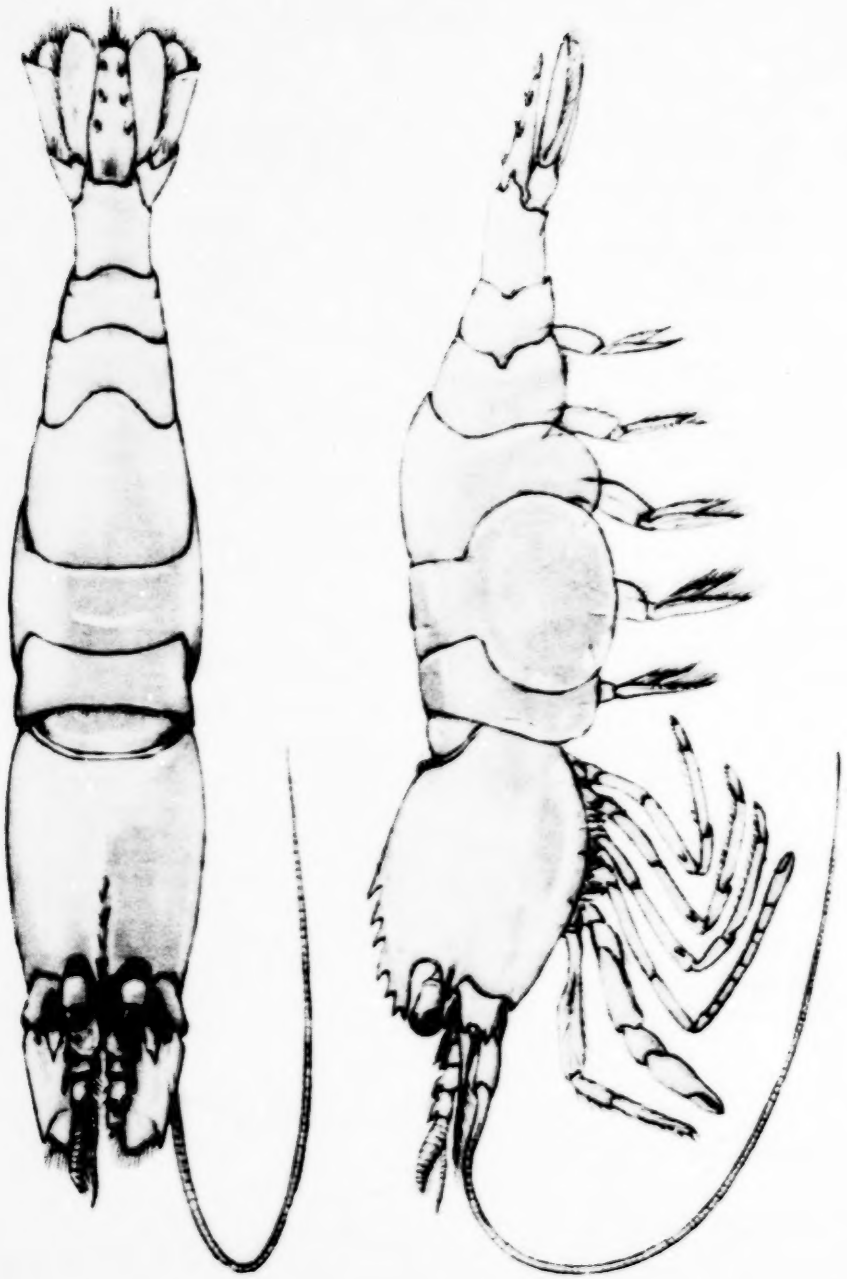

Fig. 2. Heptacarpus taylori (Stimpson, 1857)

TABLE 1

Material Examined

Locality	Depth (m)	No. of Specimens	Cat./Sta. No.
Neocrangon resima			
Off La Pérouse Bank 48° 24.7′N. 126° 06.2′W.	277	1	* BCPM 241-7
Owen Pt., Port San Juan 48° 28.3′N. 124° 26.7′W.	200	36	BCPM 975-72-9
Off La Pérouse Bank 48° 28.8′N. 126° 10.3′W.	277–284	2	BCPM 239-3
S.W. of Pachena Bay 48° 35.5′N. 125° 16.5′W.	122	6	BCPM 985-20-2
5 mi. off Cape Beale, Vancouver Island 48° N. 125° W.	96	1	BCPM 975-276-1
Mill Bay, Saanich Inlet 48° 38.8′N. 123° 32.3′W.	19+	1	BCPM 101-6
Shute Passage 48° 41.5′N. 123° 21.8′W.	58–63	1	BCPM 978-144-3
Satellite Channel 48° 43.7′N. 123° 25.7′W.	75–95	1	BCPM 978-146-8
Swanson Channel 48° 46′N. 123° 19′W.	74–92	5	BCPM 976-1218-5
La Pérouse Bank 48° 46.1′N. 126° 07.1′W.	120	31	BCPM 985-29-3
Off Barkley Sound 48° 47′N. 125° 29′W.	109	7	BCPM 985-3-1
Off La Pérouse Bank 48° 54.7′N. 126° 16.6′W.	133–135	1	BCPM 244-3
Georgia Strait 49°N. 123°W.	—	1	BCPM 974-120-4
Pylades Channel 49° 06′N. 123° 42′W.	—	1	BCPM 976-1160-4
Off Sturgeon Bank, Georgia Str. 49° 12.1′N. 123° 18.6′W.	109–128	15	BCPM 982-57-1
Off Sturgeon Bank, Georgia Str. 49° 13.5′N. 123° 17.8′W.	70–95	7	BCPM 982-56-1
Off Darrell Bay, Howe Sound 49° N. 123° W.	146	2	BCPM 979-11004-3
S.W. of Kyuquot Sound 49° 45.7′N. 127° 30.1′W.	150	3	BCPM 983-1658-3
S. of Whitely Is., Kyuquot Snd. 50° 0.1′N. 127° 12.45′W.	210	1	BCPM 983-1644-3
Off Guillod Pt., Kyuquot Snd. 50° 02.8′N. 127° 14.8′W.	210	1	BCPM 983-1645-3
Neroutsos Inlet, Quatsino Snd. 50° 27.6′N. 127° 32.2′W.	190	7	BCPM 983-1638-2
Off Cliffe Pt., Quatsino Snd. 50° 27.9′N. 127° 57.4′W.	180–250	6	BCPM 983-1636-6
Forward Inlet, Quatsino Sound 50° 29′N. 128° 02′W.	45–60	9	BCPM 981-217-7
Buchholz Channel, Quatsino Snd. 50° 29.8′N. 127° 36.6′W.	129	1	BCPM 983-1639-5
Smith Island, Chatham Sound 54° N. 130° W.	—	1	BCPM 975-315-19
Chatham Sound 54° 09.6′N. 130° 24.3′W.	96–100	1	BCPM 245-1
Agnew Bank, Chatham Sound 54° 11′N. 130° 19′W.	—	1	BCPM 975-284-16
Alice Arm, Observatory Inlet 55° 25.00′N. 129° 40.78′W.	—	3	BCPM 982-343-1
Alice Arm, Observatory Inlet 55° 25.03′N. 129° 40.78′W.	—	5	BCPM 982-331-1
La Pérouse Bank 48° 37.0′N. 126° 0.8′W.	118	1	DS #56
Off Pachena Pt. 48° 38.3′N. 125° 16.5° W.	107	1	DS #20
La Pérouse Bank 48° 40.9′N. 126° 02.8′W.	122	1	DS #35
La Pérouse Bank 48° 40.9′N. 126° 02.8′W.	122	1	DS #36
La Pérouse Bank 48° 40.9′N. 126° 02.8′W.	122	1	DS #37
La Pérouse Bank 48° 43.1′N. 126° 05.0′W.	124	1	DS #39
La Pérouse Bank 48° 43.1′N. 126° 05.0′W.	124	1	DS #40
La Pérouse Bank 48° 43.1′N. 126° 05.0′W.	119	1	DS #5
La Pérouse Bank 48° 43.1′N. 126° 05.0′W.	119	1	DS #8
Off Barkley Sound 48° 46.0′N. 125° 34.4′W.	155	1	DS #96
Off Barkley Sound 48° 47′N. 125° 29′W.	109	1	DS #21
Thiepval Channel, Barkley Snd. 48° 54.5′N. 125° 20.4′W.	26	3	BMS #26
Imperial Eagle Channel 48° 58′N. 125° 10′W.	96	1	Sta. 127/69
Off San Diego, California, Albatross Sta. 2935 32° 44.5′N. 117° 23.0′W. syntypes	229	6	USNM 25246
Lebbeus polaris			
Alice Arm, Observatory Inlet 55° 26.2′N. 129° 39.7′W.	102	1	BCPM 987-26-1
Heptacarpus taylori			
Triquet Island 51° 48.4′N. 128° 14.3′W.	intertidal	5	BCPM 987-27-1

* BCPM—Royal British Columbia Museum
BMS—Bamfield Marine Station
DS—Dobrocky Seatech.
USNM—Smithsonian Institution.

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British Columbia Cataloguing in Publication Data

Main entry under title:
Contributions to natural science.—No. 1 (Sept. 30, 1985)—
Irregular.
Caption title.
Each no. has also a distinctive title.
Imprint varies: 1985–1987 British Columbia Provincial Museum, 1988– Royal British Columbia Museum.
Includes bibliographies.
ISSN 0829-609X = Contribution to natural science

1. Natural history — Periodicals. I. British Columbia Provincial Museum. II. Royal British Columbia Museum.

QH1.C66 508.711

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